

## II. CLAIM AMENDMENTS

Please amend the claims as set forth in the following listing of the claims.

1. (Currently amended) A thin film resonator ~~structure~~ (1200, 1300, 1400), where a certain wave mode is piezoelectrically excitable and which resonator ~~structure~~ comprises at least two conductor layers (110, 120) and at least one piezoelectric layer (100) in between the conductor layers, said resonator ~~structure~~ having a first area over which said conductor layers and piezoelectric layer extend, which first area is a piezoelectrically excitable area of the resonator ~~structure~~, characterized in that

- the resonator ~~structure~~ comprises a frame-like zone (2, 4) of any shape which frame-like zone confines a center area (3) within the first area of the resonator ~~structure~~,
- the resonator is adapted to operate in the thickness extensional wave mode as a TE mode and in such a way that a cut-off frequency of the piezoelectrically excited thickness extensional wave mode in the layer structure of the frame-like zone is different from the cut-off frequency of the piezoelectrically excited thickness extensional wave mode in the layer structure of the center area, and
- the resonator is adapted in such a way that a width of the frame-like zone and acoustical ~~properties~~ property means of the layer structure in the frame-like zone are arranged so that displacement relating to the piezoelectrically excited

strongest resonance mode is substantially uniform in the center area of the resonator.

2. (Currently amended) A resonator ~~structure~~ according to claim 1, **characterized** in that the width of the frame-like zone is not uniform.

3. (Currently amended) A resonator ~~structure~~ according to claim 1, **characterized** in that the cross-section of the frame-like zone is not uniform.

4. (Currently amended) A resonator ~~structure~~ according to claim 1, **characterized** in that the frame-like zone has a substantially uniform width.

5. (Currently amended) A resonator ~~structure~~ according to claim 4, **characterized** in that the cross-section of the frame-like zone is substantially rectangular.

6. (Currently amended) A resonator ~~structure~~ according to claim 4, **characterized** in that the width of the frame-like zone and the cut-off frequency in the layer structure of the frame-like zone are arranged so that a lateral resonance frequency in infinitely long rectangular resonator, whose width is twice the width of the frame-like zone, where the cut-off frequency is the same as the cut-off frequency in the layer structure in the frame-like zone and which is surrounded by the layer structure

of the area surrounding the frame-like zone, is substantially the same as the cut-off frequency in the center area.

7. (Currently amended) A resonator ~~structure~~ (1230) according to claim 1, **characterized** in that the frame-like zone is substantially circular.

8. (Currently amended) A resonator ~~structure~~ (1220) according to claim 1, **characterized** in that the frame-like zone is substantially polygonal.

9. (Currently amended) A resonator ~~structure~~ (1210) according to claim 8, **characterized** in that the frame-like zone is substantially rectangular.

10. (Currently amended) A resonator ~~structure~~ according to claim 9, **characterized** in that the cross-section of the frame-like zone is substantially rectangular.

11. (Currently amended) A resonator ~~structure~~ (820, 840, 850) according to claim 1, **characterized** in that the cut-off frequency of the piezoelectrically excited wave mode in the layer structure of the frame-like zone is higher than the cut-off frequency of the piezoelectrically excited wave mode in the layer structure of the center area.

12. (Currently amended) A resonator ~~structure~~ according to claim 11, **characterized** in that the dispersion of the piezoelectrically excited wave mode is of type II in the frame-like area.

13. (Currently amended) A resonator ~~structure~~ (810, 830, 860) according to claim 1, **characterized** in that the cut-off frequency of the piezoelectrically excited wave mode in the layer structure of the frame-like zone is lower than the cut-off frequency of the piezoelectrically excited wave mode in the layer structure of the center area.

14. (Currently amended) A resonator ~~structure~~ according to claim 13, **characterized** in that the dispersion of the piezoelectrically excited wave mode is of type I in the frame-like area.

15. (Currently amended) A resonator ~~structure~~ (1000, 1300, 1700, 1820) according to claim 1, **characterized** in that the frame-like zone is within the first area.

16. (Currently amended) A resonator ~~structure~~ according to claim 1, **characterized** in that the frame-like zone is at least partly outside the first area.

17. (Currently amended) A resonator ~~structure~~ (1810, 1820) according to claim 1, **characterized** in that at least one of the

layers of the resonator has a first part, which is patterned by variation in thickness, and a second part of uniform thickness.

18. (Currently amended) A resonator ~~structure~~ (1810) according to claim 17, **characterized** in that the first part is a rim covering the frame-like zone.

19. (Currently amended) A resonator ~~structure~~ according to claim 18, **characterized** in that the layer having the first part and the second part is a top electrode of the resonator ~~structure~~.

20. (Currently amended) A resonator ~~structure~~ (1820) according to claim 17, **characterized** in that the second part covers the frame-like zone.

21. (Currently amended) A resonator ~~structure~~ according to claim 20, **characterized** in that the layer having the first part and the second part is a passivation layer of the resonator ~~structure~~.

22. (Currently amended) A resonator ~~structure~~ (1710) according to claim 1, **characterized** in that

- the thickness of the center area is substantially uniform,
- the thickness of a region surrounding the frame-like zone is substantially uniform at a certain region next to an

interface between the frame-like zone and the surrounding region, and

- the thickness of the frame-like zone varies over the width of the frame-like zone.

23. (Currently amended) A resonator ~~structure~~ according to claim 22, **characterized** in that the frame-like zone is thicker at an interface between the center area and the frame-like zone than at the interface between the frame-like zone and the surrounding material.

24. (Currently amended) A resonator ~~structure~~ according to claim 22, **characterized** in that the frame-like zone is thinner at the interface between the center area and the frame-like zone than at the interface between the frame-like zone and the surrounding material.

25. (Currently amended) A resonator ~~structure~~ (1400) according to claim 1, **characterized** in that in the frame-like zone a first layer (120) extending at least over the center area and the frame-like zone overlaps with a second layer (140) extending over the frame-like zone and over some part of the area surrounding the frame-like zone.

26. (Currently amended) A resonator ~~structure~~ according to claim 25, **characterized** in that the first layer is one of the conductor layers and the second layer is a passivation layer.

27. (Currently amended) A resonator ~~structure~~ (1300) according to claim 1, **characterized** in that it comprises at least one frame-like layer, which forms the frame-like zone.

28. (Currently amended) A resonator ~~structure~~ (1000) according to claim 1, **characterized** in that the frame-like zone is arranged by varying the thickness of at least one of the layers extending at least over the frame-like zone and the center area, so that the thickness of said layer is different in the frame-like zone than in the center area.

29. (Currently amended) A resonator ~~structure~~ according to claim 28, **characterized** in that said layer is a top electrode (120) of the resonator ~~structure~~.

30. (Currently amended) A resonator ~~structure~~ according to claim 28, **characterized** in that said layer is thicker in the frame-like zone than in the center area.

31. (Currently amended) A resonator ~~structure~~ according to claim 28, **characterized** in that said layer is thinner in the frame-like zone than in the center area.

32. (Currently amended) A resonator ~~structure~~ according to claim 1, **characterized** in that it is a thin film bulk acoustic wave resonator.

33. (Currently amended) A resonator ~~structure~~ according to claim 1, **characterized** in that the thickness of the resonator ~~structure~~ in the center area is substantially uniform.

34. (Currently amended) A resonator ~~structure~~ according to claim 1, **characterized** in that the thickness of the resonator in the center area is different in a first part of the center area than in a second part in the center area.

35. (Currently amended) A filter comprising at least one thin film resonator ~~structure~~ (1200, 1300, 1400), where a certain wave mode is piezoelectrically excitable and which resonator ~~structure~~ comprises at least two conductor layers (110, 120) and at least one piezoelectric layer (100) in between the conductor layers, said resonator ~~structure~~ having a first area over which said conductor layers and piezoelectric layer extend, which first area is a piezoelectrically excitable area of the resonator ~~structure~~, **characterized** in that

- the resonator ~~structure~~ comprises a frame-like zone (2, 4) of any shape which frame-like zone confines a center area (3) within the first area of the resonator ~~structure~~,
- the resonator is adapted to operate in the thickness extensional wave mode as a TE mode and in such a way that a cut-off frequency of the piezoelectrically excited thickness extensional wave mode in the layer structure of the frame-like zone is different from the cut-off frequency of the piezoelectrically excited thickness extensional wave mode in the layer structure of the center area, and



- the resonator is adapted in such a way that a width of the frame-like zone and acoustical ~~properties~~ property means of the layer structure in the frame-like zone are arranged so that displacement relating to the piezoelectrically excited strongest resonance mode is substantially uniform in the center area of the resonator.

36. (Currently amended) A filter according to claim 35 wherein the resonator ~~structure~~ comprises at least four layers that includes at least two piezoelectric layers.

37. (Previously presented) A filter according to claim 36 wherein each of said two conductor layers and each of said two piezoelectric layers is a thin film.

38. (Currently amended) A resonator ~~structure~~ according to claim 1 wherein the resonator ~~structure~~ comprises at least four layers that includes at least two piezoelectric layers.

39. (Currently amended) A resonator ~~structure~~ according to claim 38 wherein each of said two conductor layers and each of said two piezoelectric layers is a thin film.